

CLAIMS

1.. A component mounting apparatus (101) for mounting a plurality of components (2) of semiconductor chips (2) fed from a diced wafer (1) on a board (8), comprising:

5 a board holding device (5, 6) for holding the board fed to the component mounting apparatus releasably at a board holding position (A, B, C and D);

10 a first mounting head (4) for holding and taking out the component fed from a first component feeding position (E) and mounting the component on the board held at the board holding position;

15 a second mounting head (34) for holding and taking out the component fed from a second component feeding position (F) and mounting the component on the board held at the board holding position; and

20 a component feeding device (11) which is provided with a wafer holding table (12) for holding the wafer and a table moving device (16) for moving the wafer holding table reciprocationally between the first component feeding position and the second component feeding position, so as to feed the component from the wafer to each moving head at each component feeding position.

25 2. The component mounting apparatus as defined in claim 1, wherein

the board holding device has a first board holding position (A, C) where the board on which the component is mounted by the first mounting head is held, and a second board holding position (B, D) where the board on which the component is mounted by the second mounting head is held, as the board holding positions, further comprising:

5 a first head moving device for moving the first mounting head roughly along a surface of the board independently so as to move between the first board holding position and the first component feeding position; and

10 a second head moving device for moving the second mounting head roughly along the surface of the board independently so as to move between the second board holding position and the second component feeding position.

15 3. The component mounting apparatus as defined in claim 2, wherein

in the component feeding device,

20 the wafer holding table has a holding portion (53) for holding a wafer sheet (50) which sticks the respective components onto a top surface of the wafer sheet;

25 a push-up device (40) is further provided for pushing up one component of the respective components to peel the one component from the wafer sheet so that the one

component is fed; and

the push-up device is moved reciprocationally between the first component feeding position and the second component feeding position, together with the wafer holding table.

4. The component mounting apparatus as defined in claim 3, wherein

the push-up device comprising:

a push-up pin (45) for pushing up the component from below of the wafer sheet;

a push-up pin holding section (41) for holding the push-up pin liftably which has a sheet contact portion (42) in contact with a bottom surface of the wafer sheet; and

a push-up pin elevator (44) for lifting up and down the push-up pin between a storing position (J) where a push-up tip of the push-up pin is stored inside the sheet contact portion and a push-up position (K) where the component is pushed up through the wafer sheet, located in an upper position than the sheet contact portion, wherein

the push-up device is moved with the wafer holding table, bringing the sheet contact portion into contact with the wafer sheet in a condition in which the push-up pin is located at the storing position by the push-up pin elevator.

5. The component mounting apparatus as defined in claim 4, wherein

the push-up device is provided with a push-up pin relative movement device (20) for moving the push-up pin holding section and the wafer sheet relatively to each other along the surface of the wafer sheet, and

an alignment of the one component with the push-up pin is conducted by the relative movement of the push-up pin relative movement device in a condition in which the sheet contact portion of the push-up pin holding section is in contact with the wafer sheet.

6. The component mounting apparatus as defined in claim 2, further comprising a component recognition device (14) for recognizing positions of the respective fed components on the wafer holding table corresponding the wafer holding table located at a component recognition position (G) which is located between the first component feeding position and the second component feeding position.

7. The component mounting apparatus as defined in claim 6, wherein

the first mounting head is provided with a plurality of component holding members (3) for holding the component releasably; and

a control device (70) is provided for controlling the component feeding device to move the wafer holding

table to the component recognition position, controlling the component recognition device to recognize positions of the respective components which are held and taken out by the respective component holding members of the first 5 mounting head at the component recognition position, controlling the component feeding device to move the wafer holding table to the first component feeding position, and controlling the first head moving device to hold and take out the respective components based on recognition results 10 of the respective positions at the first component feeding position by the component holding members in order.

8. The component mounting apparatus as defined in claim 2, wherein

the first mounting head and the second mounting 15 head are further provided with a head-mounted component recognition device (91, 92) for recognizing the positions of the respective fed components on the wafer holding table corresponding to the wafer holding table which is located at either the first component feeding position or the 20 second component feeding position.

9. The component mounting apparatus as defined in claim 2, wherein

a control device (70) is provided, for controlling the first head moving device and 25 the first mounting head to hold and take out the component

by the first mounting head at the first component feeding position, to move the first mounting head to the board holding position with the held component, to mount the held component on the board, and to return the first mounting
5 head to the first component feeding position, and

for controlling the component feeding device, the second head moving device and the second mounting head to move the wafer holding table from the first component feeding position to the second component feeding position,
10 to hold and take out the component by the second mounting head at the second component feeding position, and to return the wafer holding table to the first component feeding position to be located there, until arriving of the first mounting head at the first component feeding position.
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10. A component mounting method for mounting a plurality of components (2) of semiconductor chips (2) fed from a diced wafer (1) on a board (8), wherein

in a component mounting apparatus (101) which is provided with a first mounting head (4) for holding and
20 taking out the component fed from a first component feeding position (E) to mount the component on the board held at a board holding position (A, B, C or D), a second mounting head (34) for holding and taking out the component fed from a second component feeding position (F) to mount the
25 component on the board held at the board holding position,

and a wafer holding table (12) which is moved reciprocationally between the first component feeding position and the second component feeding position, for holding the wafer so that that the respective components
5 are fed, wherein

holding and taking out the component by the first mounting head at the first component feeding position, moving the first mounting head to the board holding position with the held component, mounting the held
10 component on the board, and then returning the first mounting head to the first component feeding position,

until arriving of the first mounting head at the first component feeding position, moving the wafer holding table from the first component feeding position to the
15 second component feeding position, holding and taking out the component by the second mounting head at the second component feeding position, and then returning the wafer holding table to the first component feeding position to be located there.

20 11. The component mounting method as defined in claim 10, wherein in a process in which moving the wafer holding table from the first component feeding position to the second component feeding position, recognizing a position on the wafer holding table of the component held and taken
25 out by the second mounting head.

12. The component mounting method as defined in claim
10, wherein

locating the wafer holding table at the first
component feeding position,

5 recognizing positions on the wafer holding table
of the respective fed components by a head mounted
component recognition device (91) provided for the first
mounting head, and

holding and taking out the respective components
10 by the first mounting head based on the recognition result.

13. The component mounting method as defined in claim
11, wherein

recognizing a positional shift amount of holding
attitude of the component by the component holding member
15 provided for the second mounting head, and

correcting the recognition position of the
component on the wafer holding table based on the
recognition result of the positional shift amount.